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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/099,840      | 03/12/2002  | James J. Hofmann     | MI22-1803           | 5306             |

21567 7590 05/30/2003

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SPOKANE, WA 99201-3828

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|----------|
| EXAMINER |
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HOANG, QUOC DINH

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2818

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/099,840

Applicant(s)

HOFMANN, JAMES J.

Examiner

Quoc D Hoang

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-35 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 11-17 is/are rejected.
- 7) ☒ Claim(s) 9, 10 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

# **Notice of References Cited**

Application/Control No.

10/099,840

Applicant(s)/Patent Under  
Reexamination  
HOFMANN, JAMES J.

Examiner

Quoc D Hoang

Art Unit

2818

Page 1 of 1

## **U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name       | Classification |
|---|---|--|-----------------|------------|----------------|
|   | A | US-6518189                                       | 02-2003         | Chou       | 438/706        |
|   | B | US-6521324                                       | 02-2003         | Debe et al | 428/195        |
|   | C | US-  |                 |            |                |
|   | D | US-  |                 |            |                |
|   | E | US-  |                 |            |                |
|   | F | US-  |                 |            |                |
|   | G | US-  |                 |            |                |
|   | H | US-  |                 |            |                |
|   | I | US-  |                 |            |                |
|   | J | US-  |                 |            |                |
|   | K | US-  |                 |            |                |
|   | L | US-  |                 |            |                |
|   | M | US-  |                 |            |                |

## **FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|---|--|-----------------|---------|------|----------------|
|   | N |  |                 |         |      |                |
|   | O |  |                 |         |      |                |
|   | P |  |                 |         |      |                |
|   | Q |  |                 |         |      |                |
|   | R |  |                 |         |      |                |
|   | S |  |                 |         |      |                |
|   | T |  |                 |         |      |                |

## **NON-PATENT DOCUMENTS**

| * |   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
|   | U |   |
|   | V |   |
|   | W |   |
|   | X |   |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

**DETAILED ACTION**

***Election/Restrictions***

1. Examiner confirms that Applicants elected to prosecute Claims 1-35 and have cancelled Claims 36-44.

***Information Disclosure Statement***

2. Information Disclosure Statement (IDS) filed on 3/12/2003 and made of record as Paper No. 2. The references cited on the PTOL 1449 form have been considered.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1-8, and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior art and in view of Chou., (US Pat 6,518,189).

Regarding claims 1, 6, and 15, Applicant's Admitted Prior art teaches a method of forming a pattern in a low-k dielectric material 26 comprising: providing a semiconductor substrate 12 having the low-k dielectric material 26; and patterning the low-k dielectric material 26 to form a second pattern (see pages 1-3 and Fig. 1).

The Prior art does not teach providing a mold having a first pattern comprising projections and valleys between the projections; pressing the low-k dielectric material between the mold and the semiconductor substrate to form a second pattern in the low-k dielectric material, the second pattern being substantially complementary to the first pattern; and removing the mold from over the low-k dielectric material.

Chou teaches providing a mold having a first pattern comprising projections and valleys between the projections (col. 3, lines 25-50 and Fig. 1); pressing the dielectric material between the mold and the semiconductor substrate to form a second pattern in the dielectric material, the second pattern being substantially complementary to the first pattern (col. 3, lines 50-60 and Fig. 1); and removing the mold from over the dielectric material (col. 3, lines 60-67 and Fig. 1). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the patterned mold teaching of Chou with the Prior Art's method of forming a pattern in a low-k dielectric material, because it would improve the resolution of the imprinting and the minimal feature size as taught by Chou, column 4 lines 1-5.

Regarding claims 2-4, Chou teaches wherein the low-k dielectric material comprises a low-k polymer (col. 3, lines 50-60 and Fig. 1).

Regarding claims 7-8, Chou teaches wherein the mold comprises a silicone composition (col. 3, lines 25-50 and Fig. 1).

Regarding claims 16 and 17, Chou teaches wherein the mass does not consist essentially of photoresist (col. 3, lines 50-55 and Fig. 1).

Regarding claims 5 and 11-14, Applicant's Admitted Prior art teaches wherein the second pattern comprises shallow trenches within the low-k dielectric material and deep openings through the low-k dielectric material, and further comprising forming a conductive material 20 within the trenches and openings (see pages 1-3 and Fig. 1).

Claims 19-35 are allowed.

***Allowable Subject Matter***

5. Claims 9, 10 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9, 10 and 18 are allowable over the prior art of record because none of the prior art whether taken singularly or in combination, especially when these limitations are considered within the specific combination claims, to teach aligning the mold and substrate relative to one another before the pressing, and wherein: the semiconductor substrate has an optical alignment pattern supported thereby; and the mold comprises a region through which the optical alignment pattern can be viewed during the aligning of the mold and substrate relative to one another.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Conclusion**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (703) 306-5795. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (703) 308-4910. The fax phone numbers of the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
Quoc Hoang  
Patent examiner/AU 2818.

  
HOAI HO  
PRIMARY EXAMINER